PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/540,624 Confirmation No. 7137

Applicant : Masato HONMA et al.

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I hereby certify that this paper is being facsimile transmitted on ~~September 16, 2010~~, to the United States Patent and Trademark Office to facsimile number (571) 273-8300.

Ronald J. Kubovcik

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Masato HONMA, declare and state:

1. THAT I am one of the inventors of the layered product and integrated molded object described and claimed in the above-identified application (hereinafter: "the application").

2. THAT I am now employed and have been employed for many years by Toray Industries, Inc., of Tokyo, Japan, and since January,

2001, have been extensively involved with the technology relating to composite materials comprised of carbon fiber reinforced resins.

3. THAT I am aware that the claims of the application have been rejected as being obvious over certain prior art including Obara, JP 07-047152 A.

Obara discloses a fiber reinforced resin racket frame. The racket frame comprises a fiber reinforced thermosetting resin and a fiber reinforced thermoplastic resin in which an area where a thermosetting resin and a thermoplastic resin or a thermosetting resin, a thermoplastic resin and reinforcing fibers are intermingled with each other exists at the boundary between the fiber reinforced thermosetting resin and the fiber reinforced thermoplastic resin.

4. THAT to show that the area of the resin racket frame of Obara where the resins or the resins and reinforcing fibers are intermingled with each other is not a continuous rugged interface as recited in the claims of the application, I carried out the following tests:

Test 1

I prepared a first molding based on the disclosure of Obara. I observed cross sections of the molding at the boundary between the fiber reinforced thermosetting resin and the fiber reinforced

thermoplastic resin with an optical microscope to confirm the state of existence of the thermosetting resin and the thermoplastic resin at the boundary and compared it with the state of existence of the thermosetting resin and the thermoplastic resin at the boundary defined in claim 1 of the application. The test procedures and the results are as follows.

(A) Prepared materials:

(a) A polyvinyl fluoride film as a tube described in paragraph [0023] (Example 3) of Obara.

(b) A prepreg sheet comprising an epoxy resin and long carbon fibers disclosed in paragraph [0008] of Obara as the carbon fiber reinforced epoxy resin prepreg described in paragraph [0023] (Example 3) of Obara.

(c) A nonwoven fabric disclosed in paragraph [0017] of Obara produced by a melt blowing of a maleic acid modified polypropylene resin as the nonwoven fabric described in paragraph [0023] (Example 3) of Obara.

(d) A sheet comprising a carbon fiber aggregate in which long carbon fibers are arranged in a uni-direction along the lengthwise direction of the fibers described in paragraph [0012] of Obara impregnated with a melted maleic acid modified polypropylene

resin described in paragraph [0011] of Obara as the sheet described in paragraph [0023] (Example 3) of Obara. The melting point of the maleic acid modified polypropylene resin is not less than the temperature at which the viscosity of the epoxy resin in the prepreg sheet reaches the minimum, that is 150 ℃, and not more than 300 ℃, as described in paragraph [0010] of Obara and further the glass transition point of the maleic acid modified polypropylene resin is not more than room temperature as described in paragraph [0011] of Obara.

(B) Molding conditions:

A molding was produced in light of the molding conditions described in paragraphs [0023] to [0025] (Example 3) of Obara with the following steps.

(a) The prepreg sheet was placed on the polyvinyl fluoride film.

(b) After that, the nonwoven fabric was laminated on the prepreg sheet.

(c) After that, the sheet of the carbon fiber aggregate was laminated on the nonwoven fabric.

(d) Further, another polyvinyl fluoride film was placed on the sheet of the carbon fiber aggregate, and a laminate

(preform) was prepared.

(e) The laminate was put between aluminum flat plates and the whole of them was enveloped with a polyamide film and a sealant and an envelope was prepared.

(f) Inside pressure of the envelope was reduced to 0.1 MPa by using a vacuum pump.

(g) After that, the envelope was heated at a temperature of 200 ℃ for 20 minutes and further at a temperature of 130 ℃ for 30 minutes.

(h) After the aluminum flat plates and the polyvinyl fluoride films were cooled to room temperature, the molding was taken out from the envelope.

(C) Observation of the molding:

The temperature showing the minimum viscosity of the matrix resin of the carbon fiber reinforced epoxy resin prepreg was about 150 ℃ and the ratio of viscosity at the temperature of 50 ℃ to the minimum viscosity was about 2,000; the matrix resin flowed in a state of softening in a temperature rising process up to 200 ℃ and impregnated into a network structure of the nonwoven fabric, however the matrix resin did not reach the fiber reinforced thermoplastic resin

sheet and remained in the nonwoven fabric, since the minimum viscosity of the matrix resin was high. Further, at about 180 ℃, the nonwoven fabric and the matrix resin of the fiber reinforced thermoplastic resin sheet were melted and unified with each other.

Accordingly, an area in which the thermosetting resin and the thermoplastic resin were intermingled with each other in three dimensions and which resulted from the network structure was formed at the boundary of the fiber reinforced thermosetting resin and the fiber reinforced thermoplastic resin.

Enlarged photographs of the boundary of the fiber reinforced thermosetting resin and the fiber reinforced thermoplastic resin in the molding are shown in Figures T1, T2 and T3 attached hereto.

Conclusion:

The existing state of the thermosetting resin and the thermoplastic resin at the boundary of the fiber reinforced thermosetting resin and the fiber reinforced thermoplastic resin of the molding of Obara where the resins are intermingled does not form a continuous interface and, more particularly, does not form a continuous rugged interface as defined in claim 1 of the application.

Test 2

I prepared a second molding in accordance with Comparative

Example 2 disclosed in Obara.

The molding was produced according to the same procedure as described in the above (Example 3 of Obara) except there was no covering with the nonwoven fabric produced by melt blowing of maleic acid modified polypropylene resin. The fiber reinforced thermosetting resin and the fiber reinforced thermoplastic resin showed a clear interface between them and an area in which the thermosetting resin and the thermoplastic resin were intermingled with each other did not exist.

Enlarged photographs of the boundary of the fiber reinforced thermosetting resin and the fiber reinforced thermoplastic resin in the molding are shown in Figures T4 and T5 attached hereto.

Attachments: Photographs of Figures T1, T2, T3, T4 and T5

Brief description of the photographs:

Figure T1 is a cross sectional view of the first molding in a section perpendicular to the direction of the fibers.

Figure T2 is a cross sectional view of the first molding in a section parallel to the direction of the fibers.

Figure T3 is a cross sectional view of the first molding in a section inclined 45 degrees to the direction of the fibers.

Figure T4 is a cross sectional view of the second molding in a section perpendicular to the direction of the fibers.

Figure T5 is a cross sectional view of the second molding in a section inclined 45 degrees to the direction of the fibers.

Explanation of reference signs:

4: fiber reinforced thermosetting resin

5: fiber reinforced thermoplastic resin

6: thermosetting resin

7: thermoplastic resin

8: carbon fibers

10: Area where thermosetting resin and thermoplastic resin are intermingled with each other

TS: thermosetting resin

TP: thermoplastic resin

That all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and that further these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent resulting

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therefrom.

Date: September 24, 2010.

Signed: Masato Honma

Name: Masato HONMA

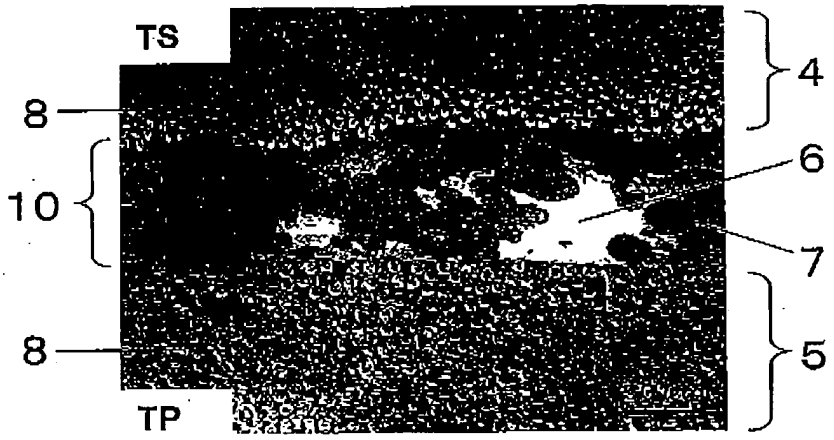

Figure T1

Figure T2

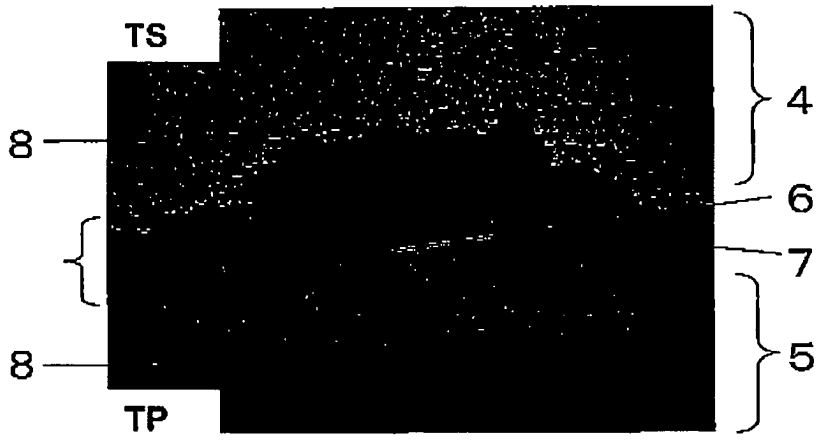

Figure T3

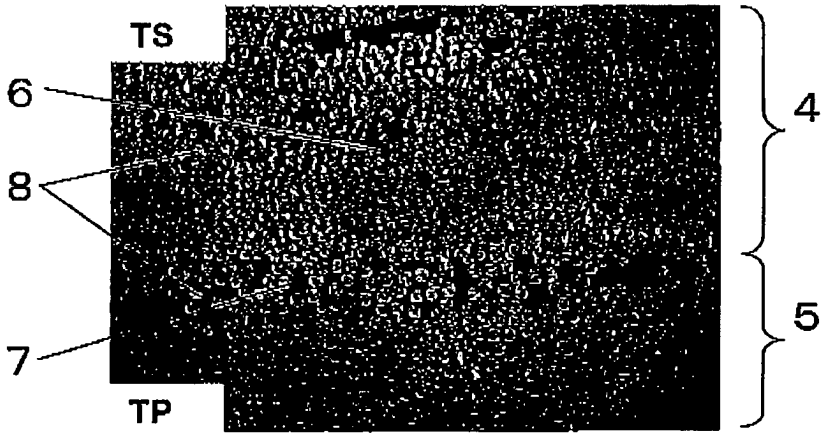

Figure T4

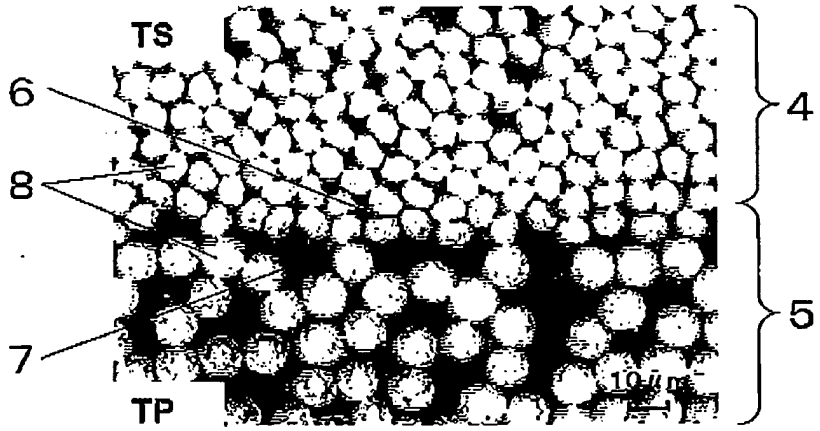

Figure T5